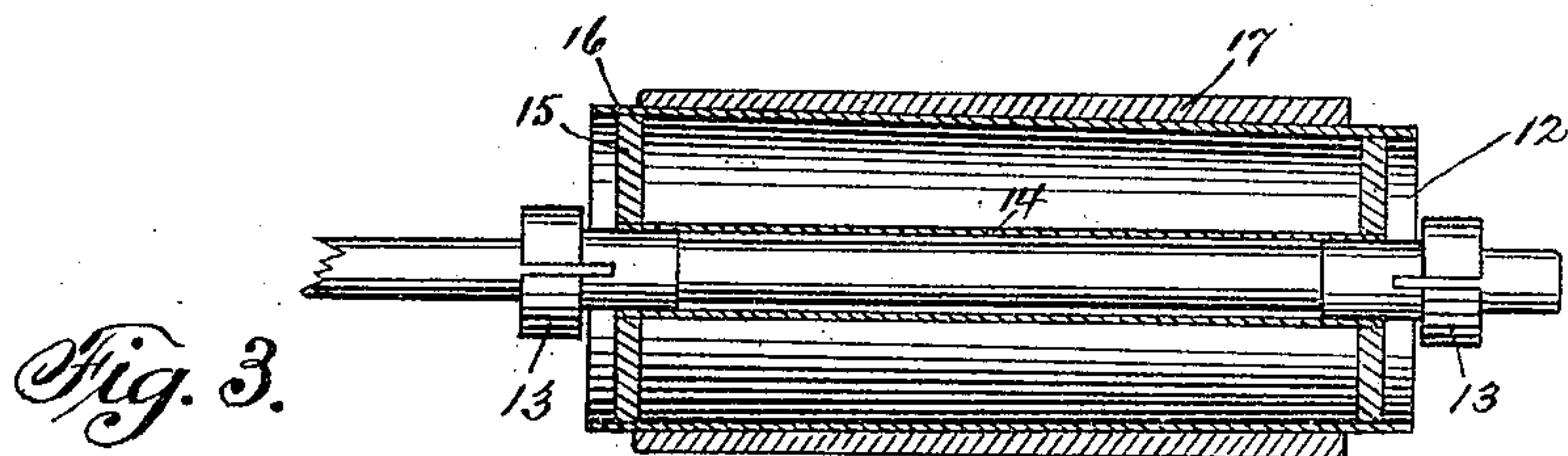
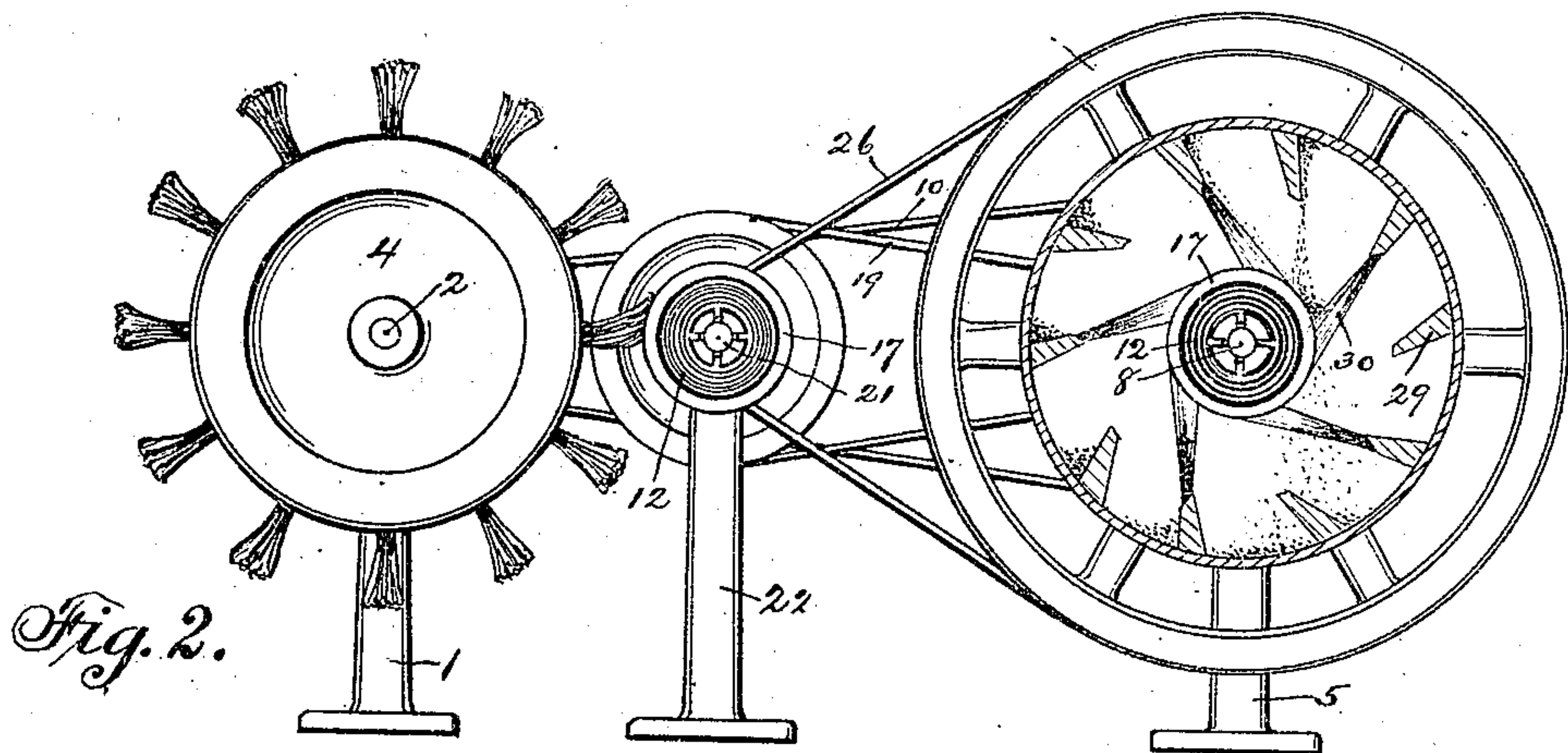
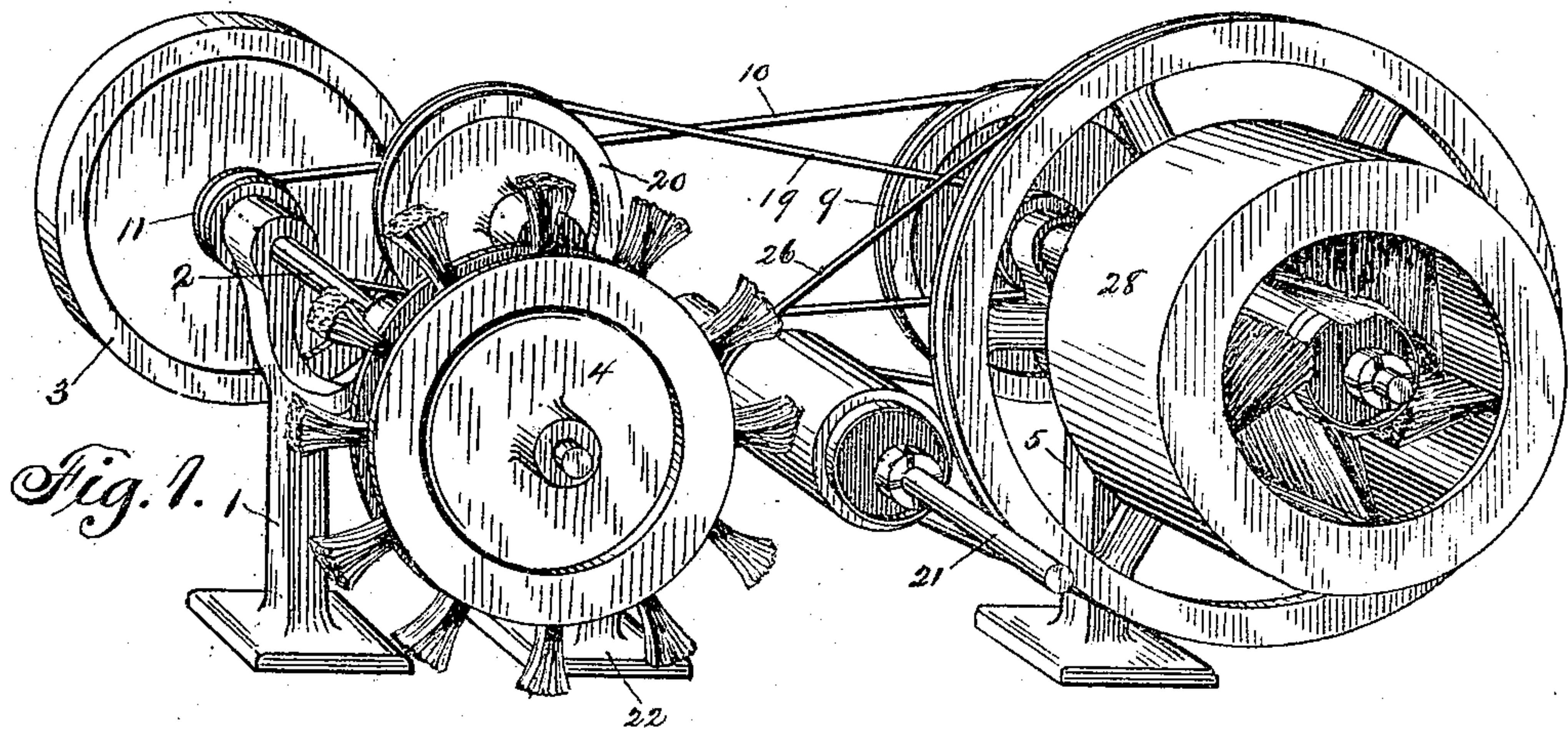


I. W. NORCROSS.
 APPARATUS FOR COATING SOUND RECORDS WITH ELECTROCONDUCTIVE MATERIAL.
 APPLICATION FILED NOV. 13, 1909.

952,753.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 1.



Witnesses:

Henry Meyer

Isaac W. Norcross
 Inventor

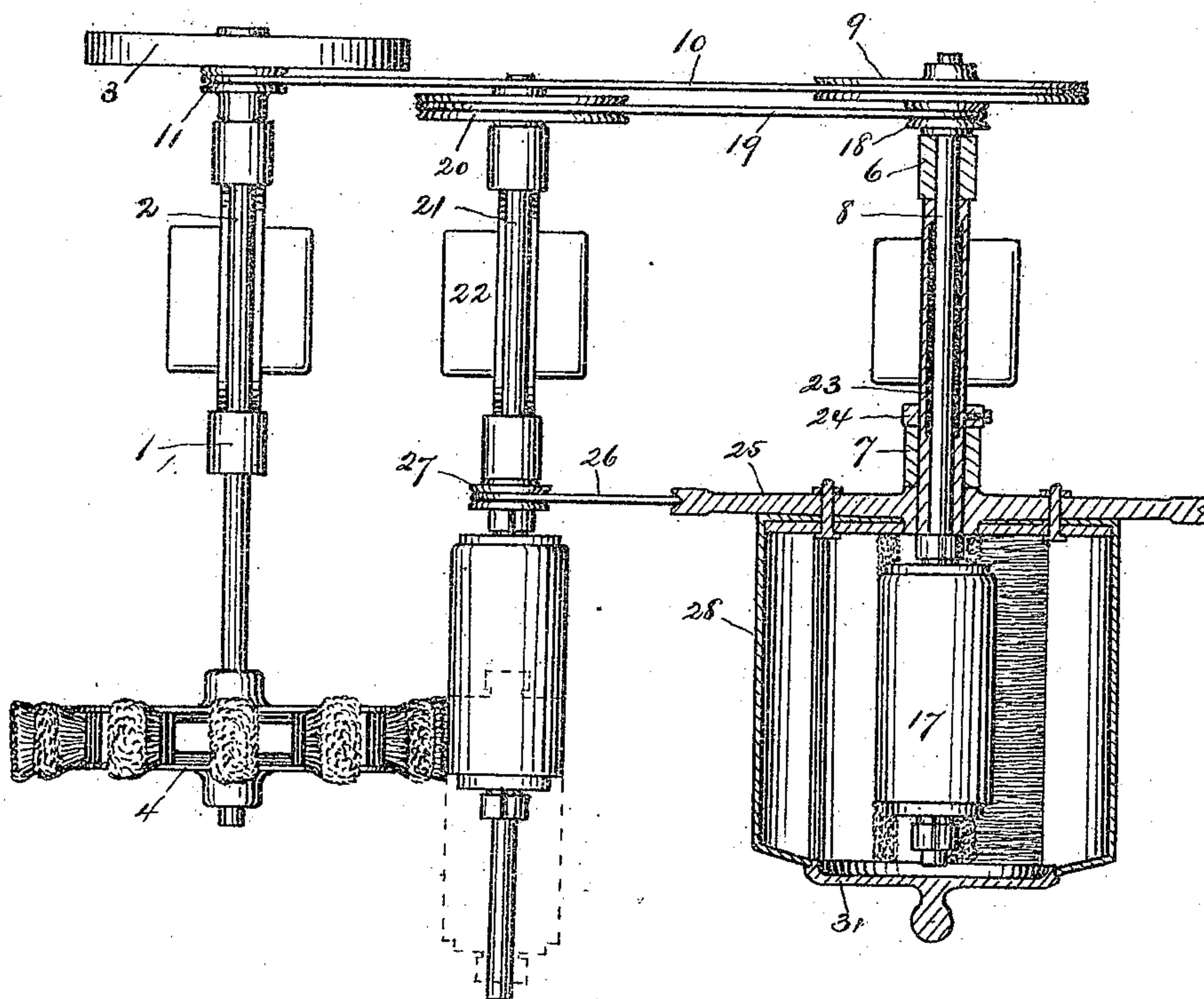
By his Attorney J. C. Edwards

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Fig. 4.



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UNITED STATES PATENT OFFICE.

ISAAC W. NORCROSS, OF NEW YORK, N. Y.

APPARATUS FOR COATING SOUND-RECORDS WITH ELECTROCONDUCTIVE MATERIAL.

952,753.

Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed November 13, 1909. Serial No. 527,764.

To all whom it may concern:

Be it known that I, ISAAC W. NORCROSS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Coating Sound-Records with Electroconductive Material, of which the following is a specification.

This invention relates to the art of making sound-records and has reference particularly to the production of numerous duplicates from an original or master record.

The invention is directed to that portion of the operation of making duplicate sound-records from an original which consists in preparing the surface of the original record by coating it with an electro-conductive substance so that a matrix may be made thereon by electro-plating. Original sound-records are commonly formed of a waxy substance and in order to form a matrix on this original it is common to provide a coating of graphite upon the surface of the original record to make its surface conductive prior to putting the record in the electro-plating bath.

Heretofore it has been the practice to apply graphite to the surface of a sound-record manually with a camel's-hair brush by wiping the brush against the record at one point and then another repeatedly to coat the record with the graphite and rub the latter into the grooves of the record as thoroughly as possible. The application of the graphite to the surface of the original record in this way has not been satisfactory both because of the character of the results obtained and because of the amount of time required, and it is the object of my present invention to provide an improved process and apparatus whereby this step in the manufacture of sound-records may be performed in a much superior manner and in much less time than is required under the method heretofore employed.

My invention consists in loading the surface of an original sound-record with the electro-conductive material and then, in an operation distinct from the loading operation, burnishing the surface of the record. I find that in this way a very much superior coating of the material is obtained, this coating having a bright, burnished surface similar to an enamel. Furthermore, the particles of the graphite are so closely laid

upon the surface of the record that the coating is impervious to moisture; this is an advantage of considerable importance for the record after being coated must be placed in the electro-plating bath and if the water of the bath finds its way through the graphite coating, the record is quite apt to be spoiled by the water coming in contact with alkali in the sound-record and forming what is known as a "soda spot." Furthermore, the coating of graphite obtained in accordance with my invention is such that the coated record may be handled with little danger of affecting the coating thereon whereas with records coated under the process heretofore commonly employed, great care had to be exercised to keep from touching the surface of the coated record.

My invention comprises the process above outlined independent of the apparatus which may be employed in practicing the invention. I have, however, shown in the accompanying drawings an apparatus which may be employed and which I prefer to employ.

In these drawings Figure 1 is a perspective view of the apparatus, Fig. 2 is an elevation of the same with one member in vertical section, Fig. 3 is a sectional view of the mandrel and Fig. 4 is a plan view of the machine with one of the parts shown in horizontal section.

Referring to these drawings, 1 indicates a standard having therein bearings for a shaft 2 on the end of which is mounted a pulley 3 by which rotary motion is communicated to the shaft 2. On the opposite end of the shaft 2 is secured a wheel 4 having a plurality of bunches of camel's-hair secured thereto so as to form a rotary camel's-hair brush. A second standard 5 has bearings formed therein, as shown at 6 and 7 (Fig. 4), for a shaft 8 on one end of which is mounted a pulley 9; a belt 10 runs on this pulley and on a pulley 11 upon the shaft 2 to transmit rotary motion from the latter shaft to shaft 8. The end of the shaft 8 opposite that to which the pulley 9 is secured is adapted to receive a mandrel 12, shown in detail in Fig. 3. This mandrel consists of two tubular pieces 13, a tube 14 connecting them, heads 15 on the tube 14 and a cylindrical piece 16 supported by the heads 15 and adapted to receive a cylindrical sound-record 17 as shown. The tubular pieces 13 are slotted and so formed as to exert a clamping action upon the shaft 8 when

the mandrel with a sound-record thereon is inserted over the forward end of the shaft 8. The shaft 8 also carries a pulley 18 on which runs a belt 19 which by means of the pulley 20 communicates rotary motion to a shaft 21 mounted in bearings formed in a standard 22. The forward end of the shaft 21 is adapted to receive the mandrel 12 and sound-record thereon just as the shaft 8 is, and when the sound-record is thus supported upon shaft 21, its surface is engaged by the rotary brush 4.

Surrounding a portion of the shaft 8 is a sleeve 23, the bearing 7 being enlarged to receive this sleeve and to permit rotation thereof independently of the shaft 8. Sleeve 23 is positioned by a collar 24 secured thereon and pulley 25 is secured to the sleeve 23 and receives a belt 26 which also runs upon a pulley 27 secured upon the shaft 21. To the pulley 25 is secured a cylindrical member 28 having a plurality of carriers 29 projecting inwardly thereof. To certain of these carriers may be secured bunches of camel's-hair 30 projecting inwardly so that their ends may engage a sound-record supported upon the shaft 8. A cover 31 may be provided whereby the end of the cylindrical member 28 may be closed when desired. The power connections between the various parts are such that the cylindrical member 28 rotates quite slowly while the shaft 8 carrying the record within the cylindrical member rotates at a very considerably higher speed. These two parts are shown as rotating in the same direction though this is not essential. The speeds which I prefer to employ are four rotations a minute for the cylindrical member 28 and one hundred revolutions a minute for the shaft 8. The brush 4 is made to rotate at very high speed preferably as much as four hundred revolutions per minute and the shaft 21 carrying the record with which the brush 4 coacts, is made to rotate in the same direction as the brush 4 at a speed which is preferably forty revolutions per minute.

In the operation of coating the surface of the cylindrical sound-record the record is first placed upon a mandrel 12 and this mandrel is then inserted upon the forward end of the shaft 8. This may be done while the mechanism is in operation for the mandrel slips readily upon the shaft 8 and then grips the latter sufficient to cause the rotation of the mandrel. A small amount of graphite is then inserted within the cylindrical member 28 and if desired the cover 31 may be placed in position. As the member 28 rotates the graphite is carried up by the carriers 29 and then deposited upon the upper surface of the sound-record 17. The sound-record is then rotating in the same direction but at a very much higher speed than the member 28, and the particles of graphite

will therefore be drawn under the brushes 30 by the rotation of the record and caused to adhere to the surface of the record. This operation is continued until a sufficient quantity of the graphite is loaded upon the surface of the record. The operator then grips the end of the mandrel and draws the latter with the record thereon off from the end of the shaft 8. Preferably, the mandrel and record are then turned around and inserted upon the shaft 8 in the reverse position in order to insure a thorough loading of the record. After this the mandrel and record are withdrawn and placed in a similar manner upon the forward end of the shaft 21. When the record is taken from within the member 28, its surface is covered with a loose, dull coating of graphite in granular form. When the record is placed upon the shaft 21 it is caused to rotate and the brush 4 also rotates in such position that the ends of the delicate bristles of camel's-hair engage the surface of the record. Because of the rotation of the shafts 2 and 21, the speed of the rubbing contact of the brushes 4 with the surface of the sound-record on shaft 21 is very high. The particles of graphite upon the record are thus compacted and caused to lie close together and to the surface of the record; furthermore, the coating of the graphite is burnished so that it has a bright, smooth surface resembling an enamel and such that the coating is impervious to moisture and will not be materially affected if touched with the fingers. If desired, the mandrel 12 with the record thereon may be moved manually upon the shaft 21 so that the brush 4 will contact with the record over the entire surface of the latter; in practice, however, I find that it is only necessary to move the mandrel in one direction manually as it works along in the opposite direction automatically. After the record has been brushed in this way for a short time, it is desirable to reverse it upon the shaft 21 as this insures getting the graphite well into the portions of the record-groove which are inclined at such an angle that the brush 4 could not act efficiently thereon when the record was in its original position.

It will thus be seen that the method of making the surface of a sound-record electro-conductive herein described, differs essentially from that heretofore employed in that there are two distinct operations, first the loading of the surface of the sound-record, and second, an operation distinct from the loading operation and consisting of burnishing the material which was loaded upon the surface of the record. The difference between coatings obtained by the two processes is readily discernible by the naked eye and it is apparent in that in the one case if the record be touched with the finger a

substantial quantity of the graphite will adhere thereto, whereas, in the other case touching the record has no appreciable effect. Furthermore, the coating obtained in accordance with this process is impervious to moisture to a very much greater degree and therefore the danger of spoiling an original record in the electro-plating bath is greatly reduced. The cost of producing coated records is also reduced since the time required for a coating operation in the process and apparatus above described is greatly reduced from that required under the process heretofore employed, particularly as it will be seen that two records may be operated upon at the same time, one being loaded while the other is being burnished.

Having described my invention what I claim as new therein and desire to secure by Letters Patent is:

1. The combination of a support for a sound-record, means for loading the surface of the sound-record on said support with an electro-conductive material, a brush, and means for causing relative rotation of the brush and record while in contact to burnish the surface of the record, substantially as set forth.

2. The combination of a support for a sound-record, means for loading the surface of the sound-record on said support with an electro-conductive material, a second support for a sound-record, a brush adjacent to said second support and adapted to contact with the surface of a record thereon, and means for rotating said second support, substantially as set forth.

3. The combination of a support for a sound-record, a rotary member surrounding the sound-record on said support, means for rotating said member, carriers on said member for carrying electro-conductive material and depositing it on the sound-record, brushes adapted to coact with the sound-record, and means for causing relative rotation of the brushes and the sound-record, substantially as set forth.

4. The combination of a support for a sound-record, a rotary member surrounding the sound-record on said support, means for rotating said member, carriers on said member for carrying electro-conductive material and depositing it on the sound-record, brushes adapted to coact with the sound-record, and means for rotating the sound-record in a direction to draw the material deposited thereon under the said brushes, substantially as set forth.

5. The combination of a support for a sound-record, a rotary member surrounding

the sound-record on said support, means for rotating said member, carriers on said member for carrying electro-conductive material and depositing it on the sound-record, brushes mounted on said member and engaging the surface of a sound-record on said support, and means for rotating said support with the sound-record thereon, substantially as set forth.

6. The combination of a support for a sound-record, a rotary member surrounding the sound-record on said support, means for rotating said member, carriers on said member for carrying electro-conductive material and depositing it on the sound-record, brushes adapted to coact with the sound-record, means for causing relative rotation of the brushes and the sound-record, a second support for a sound-record, a brush mounted adjacent thereto, and means for rotating said brush, substantially as set forth.

7. The combination of a support for a sound-record, a rotary member surrounding the sound-record on said support, means for rotating said member, carriers on said member for carrying electro-conductive material and depositing it on the sound-record, brushes adapted to coact with the sound-record, means for rotating the sound-record in a direction to draw the material deposited thereon under the said brushes, a second support for a sound-record, means for rotating the same, a brush mounted adjacent to the record on said second support so as to contact therewith, and means for rotating said last-named brush, substantially as set forth.

8. The combination of a support for a sound-record, a rotary member surrounding the sound-record on said support, means for rotating said member, carriers on said member for carrying electro-conductive material and depositing it on the sound-record, brushes mounted on said member and engaging the surface of a sound-record on said support, means for rotating said support with the sound-record thereon, a second support for a sound-record, a brush mounted adjacent thereto and adapted to contact with the record on said support, and means for rotating said last-named support and brush, substantially as set forth.

This specification signed and witnessed this 8th day of November, 1909.

I. W. NORCROSS.

Witnesses:

D. S. EDMONDS,
HENRY MEYER.